IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
TYLER DIVISION

GTX CORPORATION,	§	
	§	
Plaintiff,	§	
	§	
vs.	§	**CASE NO. 6:06 CV 244**
	§	**PATENT CASE**
KOFAX IMAGE PRODUCTS INC.,	§	
PEGASUS IMAGING CORPORATION,	§	
NUANCE COMMUNICATIONS INC.,	§	
LEAD TECHNOLOGIES INC.,	§	
EASTMAN KODAK COMPANY,	§	
XEROX CORPORATION, and CANON	§	
U.S.A., INC.,	§	
	§	
Defendants.	§	

MEMORANDUM OPINION

This claim construction opinion construes the terms in U.S. Patent No. 7,016,536 (the "'536 patent").

BACKGROUND[1]

The patent at issue involves the manipulation of scanned documents. The '536 patent claims specific methods for cleaning up scanned images without human intervention. When scanning a document, undesired distortion and noise may appear, and the '536 patent's technology allows for automatically deskewing and despeckling the document's content to remove the distortion and noise.

The '536 patent's technology allows the users to process large amounts of information in less time by removing the need for human intervention. GTX alleges that Defendants Kofax Image Products Inc. ("Kofax"), Nuance Communications Inc. ("Nuance"), and Canon U.S.A.,

[1]U.S. patent No. 5,159,667 was argued at the *Markman* hearing but has since been withdrawn from this suit. Accordingly , the Court does not address it in this Opinion.

Inc.("Canon") (collectively "Defendants") infringe GTX's '536 patent.

APPLICABLE LAW

"It is a 'bedrock principle' of patent law that 'the claims of a patent define the invention to which the patentee is entitled the right to exclude.'" *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (quoting *Innova/Pure Water Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)). In claim construction, courts examine the patent's intrinsic evidence to define the patented invention's scope. *See id.*; *C.R. Bard, Inc. v. U.S. Surgical Corp.*, 388 F.3d 858, 861 (Fed. Cir. 2004); *Bell Atl. Network Servs., Inc. v. Covad Commc'ns Group, Inc.*, 262 F.3d 1258, 1267 (Fed. Cir. 2001). This intrinsic evidence includes the claims themselves, the specification, and the prosecution history. *See Phillips*, 415 F.3d at 1314; *C.R. Bard, Inc.*, 388 F.3d at 861. Courts give claim terms their ordinary and accustomed meaning as understood by one of ordinary skill in the art at the time of the invention in the context of the entire patent. *Phillips*, 415 F.3d at 1312–13; *Alloc, Inc. v. Int'l Trade Comm'n*, 342 F.3d 1361, 1368 (Fed. Cir. 2003).

The claims themselves provide substantial guidance in determining the meaning of particular claim terms. *Phillips*, 415 F.3d at 1314. First, a term's context in the asserted claim can be very instructive. *Id*. Other asserted or unasserted claims can also aid in determining the claim's meaning because claim terms are typically used consistently throughout the patent. *Id*. Differences among the claim terms can also assist in understanding a term's meaning. *Id*. For example, when a dependent claim adds a limitation to an independent claim, it is presumed that the independent claim does not include the limitation. *Id*. at 1314–15.

"[C]laims 'must be read in view of the specification, of which they are a part.'" *Id*. (quoting *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995) (en banc)). "[T]he specification 'is always highly relevant to the claim construction analysis. Usually, it is dispositive;

it is the single best guide to the meaning of a disputed term.'" *Id*. (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)); *Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1325 (Fed. Cir. 2002). This is true because a patentee may define his own terms, give a claim term a different meaning than the term would otherwise possess, or disclaim or disavow the claim scope. *Phillips*, 415 F.3d at 1316. In these situations, the inventor's lexicography governs. *Id*. Also, the specification may resolve ambiguous claim terms "where the ordinary and accustomed meaning of the words used in the claims lack sufficient clarity to permit the scope of the claim to be ascertained from the words alone." *Teleflex, Inc.*, 299 F.3d at 1325. But, "'[a]lthough the specification may aid the court in interpreting the meaning of disputed claim language, particular embodiments and examples appearing in the specification will not generally be read into the claims.'" *Comark Commc'ns, Inc. v. Harris Corp.*, 156 F.3d 1182, 1187 (Fed. Cir. 1998) (quoting *Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 1571 (Fed. Cir. 1988)); *see also Phillips*, 415 F.3d at 1323. The prosecution history is another tool to supply the proper context for claim construction because a patent applicant may also define a term in prosecuting the patent. *Home Diagnostics, Inc., v. Lifescan, Inc.*, 381 F.3d 1352, 1356 (Fed. Cir. 2004) ("As in the case of the specification, a patent applicant may define a term in prosecuting a patent.").

Although extrinsic evidence can be useful, it is "'less significant than the intrinsic record in determining the legally operative meaning of claim language.'" *Phillips*, 415 F.3d at 1317 (quoting *C.R. Bard, Inc.*, 388 F.3d at 862). Technical dictionaries and treatises may help a court understand the underlying technology and the manner in which one skilled in the art might use claim terms, but technical dictionaries and treatises may provide definitions that are too broad or may not be indicative of how the term is used in the patent. *Id*. at 1318. Similarly, expert testimony may aid a court in understanding the underlying technology and determining the particular meaning of a term

in the pertinent field, but an expert's conclusory, unsupported assertions as to a term's definition is entirely unhelpful to a court. *Id*. Generally, extrinsic evidence is "less reliable than the patent and its prosecution history in determining how to read claim terms." *Id*.

ANALYSIS[2]

A method for producing a cleaned-up digital image

The phrase needs no construction. The phrase is found only in the preambles of claims 1, 2, 19, and 20. This phrase is neither "necessary to give life, meaning, and vitality to the claim" nor "essential to understand the limitations or terms in the claim body." *Catalina Mktg. Int'l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002). It is undisputed that the claim body completely describes the invention's structure, and the preamble only states an intended use for the invention, "producing a cleaned-up digital image." *See id.* at 808 ("[A] preamble is not limiting 'where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention'") (citing *Rowe v. Dror*, 112 F.3d 473, 478 (Fed. Cir. 1997)). Therefore, the Court does not construe this term.

Essential data images

The Court construes the term to mean "desired data images of a document." Defendants argue that the term should be construed to mean "image data reflecting the text or geometric shapes contained in the document." Defendants' construction is limited to text and geometric objects, thereby excluding picture regions.

Defendants rely on the following claim 2 language:

> (e) identifying a portion of the de-skewed first digital representation corresponding to a picture region of the document;
> (f) identifying objects representing essential data images of the document and

[2]Appendix A contains the relevant claims with the disputed terms in bold.

> marking the identified objects as data objects; and
> (g) constructing the cleaned-up digital image of the document by
> i. combining the objects in the picture region and the marked data objects . . . .

'536 patent, Col. 27:26–35. Defendants argue that because "picture region" is separately identified in step (e) and not included in step (f), including "picture regions" in essential data images would make step (g)(i) redundant. However, Defendants fail to address step (g)(ii), which reads "eliminating all objects not marked as data objects to provide a reconstructed digital representation of the essential images without the noise images." As GTX and Defendants have agreed that "essential images" has the same meaning as "essential data images" and that "data objects" means "objects representing essential data images," Defendants' proposed construction would cause step (g)(ii) to be read "eliminating all objects not marked as *objects representing image data reflecting the text or geometric shapes contained in the document* to provide a reconstructed digital representation of the *image data reflecting the text or geometric shapes contained in the document* without noise images." This proposed construction would remove not only undesired noise but also picture regions from the scanned documents.

GTX's proposed construction, "desired data images of a document," is supported by the specification. The specification refers repeatedly to two broad categories of data and image information: "essential" or "desired" and "noise." *See*, *e.g.,* '536 patent, Cols. 1:30–36, 43–46; 2:9–13, 17–27; 3:29–31. The invention contemplates preserving the desired data and images, and "picture regions" are one of the three data types to be preserved. *Id*. at Fig. 9; Cols. 1:30–35; 12:59–62 (the other two being text data and geometric data). Accordingly, the Court construes the term as "desired data images of a document."

Undesired noise images

The Court construes the term to mean "undesirable image elements." Defendants' proposed

construction is "image data other than essential data images and pictures." As explained above for essential data images, the specification contemplates two broad categories of data and image information in a document, desired and noise. *See, e.g.,* '536 patent, Cols. 1:30–36, 43–46; 2:9–13, 17–27; 3:29–31. Both parties agree that "undesired noise images" is the exact opposite of "essential data images." However, Defendants' proposed construction improperly separates "pictures" from "essential data images"; therefore, their proposed construction is incorrect. The specification and claim language supports GTX's proposed construction. *See* '536 patent, Col. 1:42–44 ("contains undesirable image data referred to as 'noise'"). Accordingly, the Court construes the term as "undesired image elements."

Object

The Court rejects GTX's and Defendants' proposed constructions and construes "object" to mean "a body of connected dark pixels on the scanned document completely surrounded by white or transparent pixels."

GTX contends that "object" should not be construed separately from "object grabbing operation" and "object images" but, in the alternative, proposes "object" means "item on the document." "Object" is used separately in several of the claims. *See, e.g.,* '536 patent, Cols. 26:65; 27:29. The specification describes "object" as a stand alone term. *See id*. at Fig. 3, block 16 ("execute object grabber to identify objects as selected MIP level"); Fig. 10, block 75 ("grab objects at this level"). The specification also references "text objects," "geometric objects," and "picture objects." *Id*. at Cols. 7:50; 13:9–17. Thus, construing "object" will be helpful to the fact finder.

Defendants propose "object" means "a linked list of linked lists generated from raw run length data representing a body of connected dark pixels in the image completely surrounded by

white (i.e. transparent) pixels, where each of the latter linked lists contains all of the pixels in a single 'shape' or 'branch' of the object image." Defendants extract their proposed construction of "object" from U.S. Patent No. 4,821,336 (the "Roye patent"), which was incorporated by reference. However, the Roye patent is not a related patent, and the incorporation by reference is only for "object grabber" enablement purposes. *Id*. at Cols.7:36–40; 8:61–64. Thus, Defendants' reliance on the Roye patent is improper.

During prosecution, the inventor defined "object" as "a body of connected dark pixels completely surrounded by white or transparent pixels." *See* Def. Resp. Br. Ex. 5, p. 21. The inventor is free to act as his own lexicographer and assign a particular meaning to a term. *Phillips*, 415 F.3d at 1316. However, that particular meaning is binding in subsequent litigation. *CVI/Beta Ventures, Inc. v. Tura LP*, 112 F.3d 1146, 1155 (Fed. Cir. 1997) ("through statements made during prosecution or reexamination an applicant for a patent or a patent owner, as the case may be, may commit to a particular meaning for a patent term, which meaning is then binding in litigation"). It is implicit in the inventor's prosecution comments that the objects are found on the scanned document, so for clarity, the Court's construction references where the "body of dark pixels" is located, "on the scanned document." *See* Def. Resp. Br. Ex. 5, p. 21 (referring to "slices," which are assembled into an "object," as "dark string of connected horizontal pixels . . . of the scanned run length data")

Accordingly, the Court construes the term "object" to mean "a body of connected dark pixels on the scanned document completely surrounded by white or transparent pixels."

Object grabbing operation

Again, the Court rejects GTX's and Defendants' proposed constructions and construes the

term to mean "generating a compilation of the pixel array data for the object images." GTX contends that "object grabbing operation" means "procedure for detecting objects in a document." GTX's proposed construction fails to explain a "grabbing" operation and focuses on an end result. The claim language limits the technology to a specific operation, "object grabbing." *See* '536 patent Cols. 26:54; 27:13. GTX's construction attempts to read out the "object grabbing" limitation by substituting the broad term "procedure."

Defendants propose that the term means "an operation that generates objects by processing an image." In an embodiment, the specification teaches, "The object grabber program obtains serial runlength data . . . . The runlength data is operated upon, line-by-line, by a decision tree classifier that creates a software 'object' . . . ." *See* '536 patent, Col. 9:5–9. The object grabber program is creating a "software object" not an object; thus, the Defendants' proposed construction for "object grabbing operation" is misplaced.

The specification describes "object grabbing" as a "building" or "grabbing" technique. *See id*. at Cols. 13:21–24; 26:18–22. The claim language makes clear that "object grabbing" is a process of compiling the data for object images. *See, e.g., id*. at Col. 26:45–47, 54–57. The specification teaches that the object grabbing operation is performed to generate an object list of all objects on the document. *See id*. at Col. 3:1–3. Accordingly, the Court construes "object grabbing operation" to mean "generating a compilation of the pixel array data for the object images."

Object images

Again, the Court rejects the parties' proposed construction and construes "object images" to mean "pixel array data representing the bodies of connected dark pixels on the scanned document completely surrounded by white or transparent pixels." GTX proposes that "object images" means

"content of the object grabbing operation." GTX's construction is technically incorrect as "object images" are the contents of the "object list" not the "object grabbing operation." '536 patent, Col. 26:54–57.

Defendants' proposed construction is "a body of connected dark pixels in the image surrounded by white (i.e. transparent) pixels." The construction is incorrect because it defines "objects" not "object images."

The parties agree that an image is comprised of pixels. The specification teaches that the object images are within the first digital representation of the essential data images and the undesired noise images. '536 Patent, Col. 3:29–36. As construed above, essential data images are picture objects, text objects, and geometric objects. Thus, the "object images" are necessarily digital data for the picture objects, text objects, geometric objects and noise objects on the scanned document. Accordingly, the Court construes the term "object images" to mean "pixel array data representing the bodies of connected dark pixels on the scanned document completely surrounded by white or transparent pixels."

Skew Angle

At the hearing, the parties agreed to construe "skew angle" as "angular offset from vertical or horizontal." *Markman* Hr'g Tr. 43:5–14, September 12, 2007.

Objects representative of the essential data images

At the hearing, the parties agreed that this phrase needs no construction. *Markman* Hr'g Tr. 86:12–87, l. 5.

Predetermined relationship

While originally the parties requested construction of the phrase "determining a skew angle

of a straight line having a predetermined relationship to some objects representative of the essential data images," at the hearing, both parties agreed to construe only "predetermined relationship," which both parties agreed means "having a known orientation." *Id*.

Rotating

The Court adopts Defendants' construction and construes "rotating" to mean:

> Transforming an image by relocating pixels using the formula:
> $x' = x \cos \Theta - y \sin \Theta$,
> $y' = x \sin \Theta + y \cos \Theta$;
> where x and y are the original coordinates of the pixel, and Θ is the angle of rotation.

GTX contends that "rotating"is unambiguous and needs no further construction but, in the alternative, proposes the term means "turning around a reference point." This alternative proposed construction relates to the rotating of physical documents, not digital representations as the '536 patent contemplates. The term is ambiguous because of the potential to confuse rotating physical documents with rotating digital representations, essentially data stored in memory.

At the hearing, GTX argued that multiple ways existed to rotate the first digital representation and, thus, Defendants' proposed construction imported a limitation not found in the claim language. After the hearing, GTX filed a supplemental brief with ten patents attached as exhibits, which GTX claimed to illustrate various methods of rotating. However, GTX's exhibits do not demonstrate various methods of rotating; the exhibits illustrate various methods of de-skewing, one of which is rotating.

The claim language states "deskewing the document by rotating the first digital representation." '536 patent, Col. 26:50–51; 27:18–19; 29:36–37 ("to deskew . . ."); 30:25–26 ("to deskew . . ."). The claim language limits the deskewing method to rotating the image. *Id*.

Defendants' extrinsic evidence shows there is only one method to rotate digital images, the above mathematical equations. *See* Donald Hearn and M. Pauline Baker, *Computer Graphics* 186 (Prentice Hall 1994) (1986) (listing the above equations as "the transformation equations for rotating a point"); Foley et al., *Computer Graphics: Principles and Practice* 203 (Addison-Wesley 2d ed. 1990) ("a rotation is defined mathematically by [the above equations]").

The specification recites "rotating" by an amount equal to the magnitude of the skew angle in relation to the digital representation and not to the physical, scanned document. '536 Patent, Col. 3:36–40. The pixel transformation identified by Defendants is the "rotation" by which the digital representation is de-skewed. Accordingly, the Court construes "rotating" to mean:

> Transforming an image by relocating pixels using the formula:
> $x' = x \cos \Theta - y \sin \Theta$,
> $y' = x \sin \Theta + y \cos \Theta$;
> where x and y are the original coordinates of the pixel, and Θ is the angle of rotation.

Object list

The Court modifies Defendants' proposed construction and construes "object list" as "a list data structure." GTX contends the term means "data compilation." GTX's proposed construction describes the aforementioned "object grabbing operation" and does not expound on what an "object list" is. Defendants propose that "object list" means "a list data structure containing objects," Defendants' proposed language of "containing objects" is inaccurate. The claim language specifies that the "object list" is of "all object images" and not of "objects." *See. id*. at Cols. 26:54–57; 27:22–24.

The claim language specifies that after performing the "object grabbing operation," the invention creates an "object list." *See id*. at Cols. 26:54–57; 27:22–25; 29:40–43; 30:29–32. Both

Defendants and GTX agree that "object list" refers to a method of storing data for later use. GTX concedes that "data structure" encompasses numerous methods for storing data. The claim language specifically denotes that the data storage is a "list." *See id*. Accordingly, the Court construes "object list" to mean "a list data structure."

Picture

The Court construes "picture" to mean "an object image that is determined to have a non-extreme aspect ratio (i.e., to have a width that is roughly equal to its height) and that is observed to become large and dense when the resolution of the de-skewed first digital representation is reduced." GTX contends that "picture" need not be separately construed from "picture region" because "picture" only appears as "picture region" in the claim language. While GTX is correct that "picture" only appears as the phrase "picture region" in the claim language, "picture" still must be construed to clarify "picture region." Although "picture" appears to have a commonly-understood meaning, "a word describing patented technology takes its definition from the context in which it was used by the inventor." *Tap Pharm. Prods., Inc. v. Owl Pharms., L.L.C.*, 419 F.3d. 1346, 1354 (Fed. Cir. 2005). Therefore, the commonly understood definition of picture will not suffice.

Alternatively, GTX proposes the construction should be "non-text data." The '536 patent refers to three categories of data objects: text objects, geometric objects, and picture regions. *See* '536 patent, Col. 12:59–61. GTX's proposed construction for picture—"non-text data"—necessarily includes geometric objects as well as picture regions. However, the specification shows that geometric objects are not a type of picture as the specification treats geometric objects and picture regions differently. *See id*. at Fig. 6; Fig. 8, Fig. 9; Col. 3:57–64. The specification also states that geometric objects may be further processed to remove "noise objects therein," whereas

picture regions may not. *Id*. at Col. 9:50–55. Therefore, GTX's proposed construction is too broad because it does not distinguish between geometric objects and picture regions.

A picture will not ordinarily have an extreme aspect ratio. *Id*. at Col. 9:46–47. The specification also provides that after the program reduces the resolution and locates "large, dense objects," it converts those objects into picture regions. *Id*. at Fig. 10; Col. 12:48–52, 61–63. Defendants have looked to the context in which "picture" was used by the inventor. *See Tap Pharm. Prods., Inc.*, 419 F.3d at 1354. As discussed above, the claim language and specification distinguish a picture from a geometric object. '536 patent at Fig. 6; Fig.8, Fig. 9; Col. 3:57–64. However, the inventor only offers the above referenced descriptions to explain the differences between a "picture" and "geometric object." While importing limitations is improper, "it is entirely proper to use the specification to interpret what the patentee meant by a word." *E.I. du Pont de Nemours & Co. v. Phillips Petroleum Co.*, 849 F.2d 1430, 1433 (Fed. Cir. 1988). Accordingly, the Court adopts Defendants' construction and construes picture to mean "an object image that is determined to have a non-extreme aspect ratio (i.e., to have a width that is roughly equal to its height) and that is observed to become large and dense when the resolution of the de-skewed first digital representation is reduced."

Picture region

The Court construes "picture region" to mean "the region of a digital representation containing a picture." GTX proposed the following: "non-text data area." As discussed above, GTX's construction includes geometric objects and is overly broad. Defendants' proposed construction offers a reference point for "region," which is the scanned document, and relies on the above construed meaning of "picture." Accordingly, the Court construes "picture region" to mean

"the region of a digital representation containing a picture."

Reduced-resolution representation

The Court construes the term to mean "a copy of an original that displays the same image area with fewer pixels than the original." GTX's proposed construction is "lower-definition representation." GTX's proposed construction substitutes "lower-definition" as a synonym for "reduced-resolution" but fails to explain what a "reduced-resolution representation" is. Even though GTX's construction would be an easy concept for a fact-finder to grasp, GTX fails to offer intrinsic or extrinsic evidence to support its construction.

Defendants' proposed construction clarifies the claim term and finds support in the specification. The patent teaches that the "reduced-resolution representation" is a copy of the original created from a first digital representation of the original document. *See* '536 patent, Fig. 4, Block 27; Col. 8:43–46. The "reduced-resolution representation" is created by reducing the resolution by a factor of 2 by converting a certain number of pixels into fewer pixels. '536 patent, Col. 8:4–9, 35–40.

GTX argues that the language, "a copy of an original," is a limitation not supported by the specification because the '536 patent does not always require making a copy of the original to reduce resolution. According to GTX, Defendants' proposed construction limits the term to the first copy of the original in contradiction to what the patent teaches. The patent teaches that before classifying characters, a plurality of MIP images of the originally scanned document are created. *Id*. at Col. 8:1–4. A document may require multiple reductions of resolution. *Id*. at Col. 8:15–17. Logically, each time the resolution is reduced, the end product is a "reduced-resolution representation" of the originally scanned document. Therefore, each "reduced-resolution representation" would be a copy

of the original. Accordingly, the Court accepts Defendants' proposed construction and construes the term as "a copy of an original that displays the same image areas with fewer pixels."

Digital image

The Court rejects both parties' proposed construction and construes the term as "a map of a document having a fixed number of rows and columns of pixels, wherein each pixel has a digital value." GTX's proposed construction is "a digital version of a document comprising a sequence of pixels." This construction is overly broad. The specification makes clear that the "classify document" subroutine creates a "map" of pixels. '536 patent, Col. 8:29–42. A "map" of pixels is more specific than a "sequence of pixels." Similarly, the use of "digital version of a document" does not accurately capture the understanding of a "map" of pixels as taught by the specification.

Defendants propose that "digital image" means "an array of ones and zeroes, each one and zero representing a single pixel in the image." Defendants argue that "digital image" is limited to binary, or black and white, images. Relying only on expert testimony, Defendants contend that this limitation exists because of the claims' use of "object" and because the specification does not disclose a method for reducing grayscale or color images. While the embodiments use binary images to illustrate the method, by reciting "digital" the claim term is broader than just binary images. Also, as discussed above, the term "object" is not restricted to binary images as "object" references "dark" pixels and not single value pixels. Defendants' construction improperly imports limitations from the illustrative embodiment. *See Phillips*, 415 F.3d at 1323.

Neither party disputes that pixels comprise the "digital image." The specification describes the document classification that follows after document acquisition as creating a "map" of pixels. '536 patent, Fig. 2; Cols. 7:13–25; 8:29–42. The document acquisition produces a fixed number of

rows and columns of pixels, commonly referred to as a map. Because of the inventor's use of "digital," each pixel has a digital value rather than a binary value. Accordingly, the Court construes "digital image" to mean "a map of a document having a fixed number of rows and columns of pixels, wherein each pixel has a digital value."

Logical ANDing operation

The Court modifies Defendants' proposed construction by changing "binary bits" to read "one or more binary bits" and construes "logical ANDing operation" to mean

> a comparison of two sequences of one or more binary bits of information where each bit in one sequence is compared to the corresponding bit in the other sequence, and the result comparison for each pair of bits is a "one" only when the two bits being compared are both "ones," otherwise, the result is "zero."

At the hearing, both sides agreed to meet and confer on a compromised construction; however, the parties were unable to agree. Each side submitted their last proposed compromised construction. GTX's newly proposed construction states that "logical ANDing operation" means "logical operation that retains only the elements that the sets of data have in common."

GTX's proposed construction is result oriented. Instead of defining what a logical ANDing operation is, GTX merely states the operation's result. GTX's proposed construction improperly attempts to broaden the claim limitations from a specific "logical ANDing operation" to an unspecified logical operation that retains elements that the sets of data have in common.

Defendants proposed the following:

> a comparison of two sequences of binary bits of information where each bit in one sequence is compared to the corresponding bit in the other sequence, and the result comparison for each pair of bits is a "one" only when the two bits being compared are both "ones," otherwise, the result is "zero."

Defendants' construction finds support in the prosecution history. The patent examiner found that

the '536 patent's use of a logical ANDing operation to combine two sets of image data was disclosed in U.S. Patent No. 5,647,027 (the "'027 patent"). Office Action dated March 18, 2005 at 3 (citing '027 patent Col. 7: 45–53). Defendants based their construction on the '027 patent's description of logical ANDing, the same description on which the '536 patent examiner relied. As the patent examiner is assumed to be familiar with the level of skill in the art, Defendants' reliance on the patent examiner is warranted. *See Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc.*, 796 F.2d 443, 447 (Fed. Cir. 1986) ("Finally, the examiner, who with the deference we owe governmental officials we assume has some expertise in interpreting the references and some familiarity with the level of skill in the art").

At the hearing, GTX argued that Defendants' construction was limited to only black and white images. However, Defendants stated that they did not intend for their construction to limit the logical ANDing to just black and white images. As the claim language does not limit the ANDing operation only to black and white images, it is necessary to clarify that the claim covers black and white as well as grayscale and color images. Thus, the Court modifies Defendants' proposed construction from "binary bits" to "one or more binary bits" to cover black and white as well as grayscale and color images. Additionally, Defendants' construction might not be read to cover black and white image pixel values as it is a "sequence" of only one bit per pixel. Grayscale and color images have multi-bit values and thus a sequence of more than one bit per pixel.

Accordingly, the Court construes "logical ANDing operation" to mean

> a comparison of two sequences of one or more binary bits of information where each bit in one sequence is compare to the corresponding bit in the other sequence, and the result comparison for each pair of bits is a "one" only when the two bits being compared are both "ones," otherwise, the result is "zero."

Performing a logical ANDing operation between the picture region and the data areas with the de-skewed first digital representation.

The Court adopts Defendants' proposed construction and construes that term to mean "performing a pixel by pixel logical ANDing operation between the de-skewed first digital representation and a mask image consisting of the essential data areas and the picture regions representation to produce a digital representation without noise images." GTX proposed that the term means "operating on a digital representation to produce a digital representation without noise images."

Again, GTX's proposed construction improperly focuses on the end result and fails to describe how one skilled in the art would interpret this phrase. GTX's use of "operating" impermissibly broadens the claim scope by reading the "logical ANDing operation" limitation out of the claim language. The claim language is limited to a specific operation, "logical ANDing"; thus, a proper construction must include that limitation.

Also, GTX attempts to remove the limitation of ANDing the picture region and data areas to produce the cleaned-up image. As the claim language denotes a specified operation to be performed on specified portions of the first digital representation, GTX cannot simply read out those limitations by focusing on an end result.

The '536 patent teaches that the program logically ANDs the first digital representation with a mask to produce the cleaned-up image. '536 patent, Fig. 23; Col. 20:46–58. GTX argues that the "pixel by pixel" language imports a limitation from the specification into the claim language. However, because the result is to provide a cleaned-up digital image, which consists of pixels, the "pixel by pixel" limitation to the logical ANDing operation is proper. Thus, the Court construes the

term to mean "performing a pixel by pixel logical ANDing operation between the de-skewed first digital representation and a mask image consisting of the essential data areas and the picture regions representation to produce a digital representation without noise images."

Combining [combine] the objects in the picture region and the marked data objects

The Court adopts Defendants' proposed construction and construes the term to mean "constructing a new digital image containing the objects in the picture region and the marked data objects." GTX contends that all sub-parts of this term have been construed; thus, the term needs no further construction. In the alternative, GTX proposes that the term means "combining the objects in the non-text data area and the objects designated as non-noise." As discussed above,"picture region" does not mean "non-text data area" because that would include geometric objects; thus, GTX's construction is again overly broad.

The term appears in the final step of Claims 2 and 20, which discuss constructing the cleaned-up digital image by combining the picture regions and marked data objects and eliminating the noise. The dispute focuses on the meaning of "combining." GTX argues that construing "combining" to mean "constructing a new digital image" imports limitations into the claims language. GTX contends that merging one component into a second does not necessarily create a new image. However, as the claim language teaches, the purpose of the program is to take the first digital representation and then de-skew it and remove noise from it to produce the cleaned-up digital image. The claim language contemplates creating a new image free from the skew and noise present in the first digital representation. '536 patent, Cols. 27:7–38; 30:13–46. Therefore, Defendants' construction does not import improper limitations into the claims language. Further, the specification describes creating the cleaned-up digital image through logical ANDing and combining

the picture region and marked data objects. *Id*. at Col. 3:50–54.

Accordingly, the Court construes the term to mean "constructing a new digital image containing the objects in the picture region and the marked data objects."

Identifying objects of the reduced-resolution representation representing essential data areas of the documents

This phrase does not require construction. The Court already construed all of the sub-parts, except "identifying" and "representing." "Identifying" and "representing" have ordinary meanings; therefore, they do not need to be separately construed. Defendants argue that the specification disclaims the use of human intervention; thus, the disclaimer must be added to the construction. However, while one embodiment contemplates no human intervention, neither the claims nor the prosecution history prohibit human intervention. Thus, Defendants' construction is incorrect.

Divergences/Divergence records & Convergence/Convergence Records

The Court does not construe these terms because the terms' ordinary meanings are readily understandable in the claim language. Defendants' proposed constructions rely exclusively on U.S. Patent No. 4,817,187 (the "Lien patent"), which was incorporated by reference. However, the Lien patent was incorporated specifically to describe the "assignee's commercially available vectorization program." '536 patent, Col. 11:27–32. The specification does not reference the Lien patent with regards to "divergence," 'divergence records," "convergence," or "convergence records." Defendants are improperly importing limitations from the Lien patent. Accordingly, the Court does not construe these terms as the terms' meanings are readily ascertainable from the claim language.

Blob and Blob records

The Court adopts GTX's proposed construction and construes "blob" to mean "object

without linear edges." Relying on the "decision tree classifier" claim language and the Roye and Lien patents, Defendants' contend that "blob" means "branches of an object, where the shape of the branch is such that it cannot be represented by four corner points because it does not consist of four straight sides." The decision tree classifier is the mechanism to determine the shape of an object and does not define "blob." The specification does not define a blob other than in regards to the linearity of its edges. *See* '536 patent, Col. 9:13–17. The specification teaches that the linearity of shapes is tested to determine if a shape can be represented by a trapezoid or if it is an irregular blob. *Id*. Accordingly, the Court construes "blob" to mean "object without linear edges."

The term "blob records" does not need construction. The Court already construed "blob," and "record" has a plain and ordinary meaning.

Trapezoid records

"Trapezoid records" has a plain and ordinary meaning to someone skilled in the art. Thus, the Court does not construe the term. Defendants propose that "trapezoid records" means "data structure associated with an object containing one or more trapezoids in the object and the four corners of each of the trapezoids."

Defendants again rely upon the Lien patent, which states that a single record has a number of trapezoids. Lien patent, Col. 9:22–25. Even though the '536 patent does not reference the Lien patent regarding "trapezoid records," Defendants restrict the term "trapezoid record" to specific embodiments of the Lien Patent, which is improper. *See Philips*, 415 F.3d at 1323. Accordingly, the Court does not construe "trapezoid records."

Open ends

This term has its plain and ordinary meaning and does not require construction. Defendants

did not propose a construction for this term; rather, they argue that Claim 3 is indefinite because of this term. Defendants argue that "open ends" is never explained in the patent and lacks an objective standard. However, the context of usage in the claim provides an objective standard. The claim reads "operating the classifier to recognize and assign identifiers to divergences, convergences, and open ends." '536 patent, Col. 27:53–54. Thus, read in context, parts are either diverging, converging, or forming open ends. The concepts of divergence and convergence give definition to open ends. Thus, no construction is necessary.

Dash-sized and Dot-sized

These terms have their plain and ordinary meaning and do not require construction. Defendants did not propose construction for either of the terms; rather, they argue that Claim 16 is indefinite because of these terms.

Defendants place artificial constraints on the terms, contending that scale parameters are not provided to indicate what these terms could mean. The terms are so simple that a lay juror would have no difficulty in understanding them. *See Philips*, 415 F.3d at 1314. It is difficult to conceive of a more clear way to convey the meaning of these terms. Accordingly, the Court does not construe any of the above terms.

CONCLUSION

For the foregoing reasons, the Court interprets the claim language in this case in the manner set forth above. The claims with the disputed terms in bold are set forth in Appendix A. For ease of reference, the Court's claim interpretations are set forth in Appendix B.

So ORDERED and SIGNED this 10th day of January, 2008.

LEONARD DAVIS
UNITED STATES DISTRICT JUDGE

APPENDIX A

U.S. Patent No. 7,016,536

1. **A method for producing a cleaned-up digital image** of a **document** including **essential data images** and **undesired noise images**, comprising:

(a) digitally scanning the document to produce a first digital representation of the **data images** and the **noise images**;

(b) performing a first **object grabbing operation** on the first digital representation to identify all **object images** thereof;

(c) **determining a skew angle of a straight line having a predetermined relationship to some objects representative of the essential data images** and **de-skewing** the document by **rotating** the first digital representation by an amount equal to the magnitude of the skew angle to provide a de-skewed first digital representation;

(d) performing a second object grabbing operation on the **de-skewed first digital representation** to create an **object list** of all object images of the de-skewed first digital representation;

(e) identifying a portion of the de-skewed first digital representation corresponding to a **picture region** of the document;

(f) producing a **reduced-resolution representation** of the de-skewed first digital representation and performing a second object grabbing operation on the reduced-resolution representation;

(g) **identifying objects of the reduced-resolution representation representing essential data areas of the document**; and

(h) **constructing the cleaned-up digital image** of the document by **performing a logical ANDing operation between the picture region and the data areas with the de-skewed first digital representation** to eliminate all objects outside of the picture region and the data areas to provide the cleaned-up digital image**.**

2. A **method for producing a cleaned-up digital image** of a document including **essential data images** and **undesired noise images**, comprising:

(a) digitally scanning the document to produce a **first digital representation** of the **data images** and the **noise images**;

(b) performing a first **object grabbing operation** on the first digital representation to identify all **object images** thereof;

(c) **determining a skew angle of a straight line having a predetermined relationship to some objects representative of the essential data images** and de-skewing the document by **rotating** the first digital representation by an amount equal to the magnitude of the skew angle to provide a de-skewed first digital representation;

(d) performing a second object grabbing operation on the de-skewed first digital representation to create an **object list** of all object images of the de-skewed first digital representation;

(e) identifying a portion of the de-skewed first digital representation corresponding to a **picture region** of the document;

(f) **identifying objects representing essential data images** of the document and **marking the identified objects as data objects**; and

(g) **constructing the cleaned-up digital image** of the document by

i. **combining the objects in the picture region and the marked data objects**, and

ii. eliminating all objects not marked as data objects to provide a reconstructed digital representation of the **essential images** without the noise images.

3. The method of claim 2 including performing the first object grabbing operation by obtaining serial runlength data from the first digital representation including slices that each include the length and ending pixel number of a string of connected pixels having a "1" value, operating line-by-line on the runlength data by means of a decision tree classifier that creates software objects including a first linked list of a number of further linked lists each of which contains all of the slices of an object image, entering the slices of the object image into a software frame in the same order in which the slices are scanned, determining if the object image can be represented as a trapezoid or as an irregular **blob** containing all of its slices, fitting the data in the software frame representing the object image into a decision tree classifier, and operating the classifier to recognize and assign identifiers to **divergences**, **convergences**, and **open ends** of the object image and create a new linked list of linked lists representing the object image in the form of **blob records**, **trapezoid records**, **divergence records**, and **convergence records** which then can be conveniently used in subsequent vectorization operations without the need to scan and recognize data representing the object image.

16. The method of claim 11 including identifying any object images which constitute dashed lines or dotted lines and marking such identified object images as data objects, by creating a grid of the wide, short rectangles or a grid of tall, narrow rectangles covering at least a portion of the document, summing the areas of all **dash-sized** for **dot-sized** objects into appropriate rectangles, eliminating objects in the appropriate rectangles having sufficiently small area sums, obtaining a histogram all objects in the appropriate rectangles by area and x-coordinate or y-coordinate, and marking each object having a sufficiently large histogram peak and located between predetermined coordinate bounds has a dashed object.

19. **A method for producing a cleaned-up digital image** of a **document** including **essential data images** and **undesired noise images**, comprising:

(a) digitally scanning the **document** to produce a **first digital representation** of the **data images** and the **noise images**;

(b) operating a processor to perform a first **object grabbing operation** on the first digital representation to identify all **object images** thereof;

(c) operating the processor to determine a **skew angle** of a straight line having a **predetermined relationship** to at least some **objects representative of essential data** and **to de-skew** the document by **rotating** the first digital representation by an amount equal to the magnitude of the skew angle to provide a **de-skewed first digital representation**;

(d) operating the processor to perform a second object grabbing operation on the de-skewed first digital representation to create an **object list** of all object images of the de-skewed first digital representation;

(e) operating the processor so as to identifying a portion of the de-skewed first digital representation corresponding to a **picture region** of the document;

(f) operating the processor to produce a **reduced-resolution representation** of the de-skewed first digital representation and to perform a second object-grabbing operation on the reduced resolution representation;

(g) operating the processor **to identify objects of the reduced-resolution representation representing essential data areas of the document**; and

(h) **constructing the cleaned-up digital image** of the document by operating the processor **to perform a logical ANDing operation between the picture region and the data areas with the de-skewed first digital representation** to eliminate all objects outside of the picture region and the data areas to provide the cleaned-up digital image.

20. **A method for producing a cleaned-up digital image of a document** including **essential data images** and **undesired noise images**, comprising:

(a) digitally scanning the document to produce a **first digital representation** of the **data images** and the **noise images**;

(b) operating a processing system to perform a first **object grabbing operation** on the first digital representation to identify all **object images** thereof;

(c) operating the processing system to determine a **skew angle** of a straight line having a **predetermined relationship** to at least some **objects representative of essential data** and to de-skew the document by **rotating** the first digital representation by an amount equal to the magnitude of the skew angle to provide a **de-skewed first digital representation**;

(d) operating the processing system to perform a second object grabbing operation on the de-kewed first digital representation to create an **object list** of all **object images** of the **de-skewed first digital representation**;

(e) operating the processing system so as to identify a portion of the **de-skewed first digital representation** corresponding to a **picture region** of the document;

(f) operating the processing system to identify **objects representing essential data images** of the document and **mark the identified objects as data objects**; and

(g) **constructing the cleaned-up digital image** of the document by operating the processing system to

i. **combine the objects in the picture region and the marked data objects to provide the cleaned-up digital image**, and

ii. eliminate all objects not marked as data objects to provide a reconstructed digital representation of the **essential images** without the noise images.

APPENDIX B

U.S. Patent No. 7,016,536	
Disputed Claim Terms	**Court's Construction**
A method for producing a cleaned-up digital image (Claims 1, 2, 19 and 20)	No construction.
document (Claims 1, 2, 19 and 20)	AGREED- a piece or pieces of paper containing information
essential data images (Claims1, 2, 19 and 20)	desired data images of a document
undesired noise images (Claims 1, 2, 19 and 20)	undesirable image elements
data images (Claims 1, 2, 19 and 20)	AGREED- " data images" has same meaning as "essential data images"
noise images (Claims 1, 2, 19 and 20)	AGREED- "noise images" has same meaning as "undesired noise images"
object (Claims 1,2, 19, and 20)	a body of connected dark pixels on the scanned document completely surrounded by white or transparent pixels
object grabbing operation (Claims 1, 2, 19 and 20)	generating a compilation of the pixel array data for the object images
object images (Claims 1, 2, 19 and 20)	pixel array data representing the bodies of connected dark pixels on the scanned document completely surrounded by white or transparent pixels
skew angle (Claim 1, 2, 19, and 20)	AGREED- angular offset from vertical or horizontal
predetermined relationship (Claims 1, 2, 19, and 20)	AGREED- having a known orientation
objects representative of the essential data images (Claims 1, 2, 19, and 20)	AGREED- no construction

U.S. Patent No. 7,016,536	
Disputed Claim Terms	**Court's Construction**
de-skewing (Claims 1, 2, 19 and 20)	AGREED- free of skew/eliminating skew
rotating (Claims 1, 2, 19 and 20)	Transforming an image by relocating pixels using the formula: $x' = x \cos \Theta - y \sin \Theta$, $y' = x \sin \Theta + y \cos \Theta$; where x and y are the original coordinates of the pixel, and Θ is the angle of rotation.
de-skewed first digital representation (Claims 1, 2, 19 and 20)	AGREED- a first digital representation from which the skew has been removed
object list (Claims 1, 2, 19 and 20)	a list data structure
picture (Claims 1, 2, 19, and 20)	an object image that is determined to have a non-extreme aspect ratio (i.e., to have a width that is roughly equal to its height) and that is observed to become large and dense when the resolution of the de-skewed first digital representation is reduced
picture region (Claims 1, 2, 19 and 20)	the region of a digital representation containing a picture." GTX's proposed the following: "non-text data area
reduced-resolution representation (Claims1 and 19)	a copy of an original that displays the same image area with fewer pixels than the original
essential data area (Claims 1 and 19)	AGREED-areas containing 'essential data images'
identifying objects of the reduce-resolution representation representing essential data areas (Claims 1 and 19)	No construction
digital image (Claims 1, 2, 19, and 20)	a map of a document having a fixed number of rows and columns of pixels, wherein each pixel has a digital value
cleaned-up digital image (Claims 1, 2, 19, and 20)	AGREED- digital image from which the undesirable image elements have been removed
constructing the cleaned-up digital image (Claims 1, 2, 19 and 20)	AGREED- creating a digital representation of data images without noise images
logical ANDing operation (Claims 1 and 19)	a comparison of two sequences of one or more binary bits of information where each bit in one sequence is compared to the corresponding bit in the other sequence, and the result comparison for each pair of bits is a "one" only when the two bits being compared are both "ones," otherwise, the result is "zero."

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Disputed Claim Terms	**Court's Construction**
data areas (Claims 1 and 19)	AGREED- has same meaning as "essential data images"
digital representation (Claims 1 and 19)	AGREED- has same meaning as "digital image"
Performing a logical ANDing operation between the picture region and the data areas with the de-skewed first digital representation (Claims 1 and 19)	performing a pixel by pixel logical ANDing operation between the de-skewed first digital representation and a mask image consisting of the essential data areas and the picture regions representation to produce a digital representation without noise images
identifying objects representing essential data images (Claim 2)	AGREED- same as 'identifying objects of the reduced resolution representation representing essential data areas"
data objects (Claims 2 and 20)	AGREED- objects representing essential data images
marking the identified objects as data objects (Claims 2 and 20)	AGREED- designating objects as representing essential data images
combining the objects in the picture region and the marked data objects (Claims 2 and 20)	constructing a new digital image containing the objects in the picture region and the marked data objects
essential images (Claim 2)	AGREED- has same meaning as "essential data images"
blob (Claim 3)	object without linear edges
divergences (Claim 3)	No construction
convergences (Claim 3)	No construction
open ends (Claim 3)	No construction
blob records (Claim 3)	No Construction
trapezoid records (Claim 3)	No construction
divergence records (Claim 3)	No construction

U.S. Patent No. 7,016,536	
Disputed Claim Terms	**Court's Construction**
convergence records (Claim 3)	No construction
dash-sized (Claim 16)	No construction
dot-sized (Claim 16)	No construction